EXECUTIVE SUMMARY

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT OF ORDINARY STONE AND GRAVEL QUARRY

(As per EIA Notification, 2006 dated 14.09.2006 and amendments)

Category-B1 - (Cluster)

Project Proponent

Thiru.R.K. PANNEERSELVAM
S/o. R.P. Kaliappan,
No. 163, Rengapalayam,
Punnam Village,
Aravakuruchi Taluk,
Karur -639 136

Project Details

Anjagoundanpatti Ordinary Stone and Gravel Quarry

S. F. No	: 3/2
Extent Area	: 0.88.0 Ha
Village	:Anjagoundanpatti
Taluk	: Aravakuruchi
District	: Karur

EIA CONSULTANT

AADHI BOOMI MINING & ENVIRO TECH (P) LTD
(QCI/NABET Accredited EIA Organization)
3/216, K.S.V.Nagar, Narasothipatti, Alagapuram (PO),
Salem – 636004, Tamil Nadu
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2024

Executive Summary

1. Introduction

The Applicant, Thiru. R. K. Panneerselvam has applied for grant of permission for quarrying ordinary stone and gravel quarry over an extent of 0.88.0 hectares in S.F.N: 3/2 located in Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District and Tamil Nadu for a period of Ten years and 5 years (From the date of execution).

The Assistant Director, Department of Geology and Mining, Karur has directed the applicant, Thiru. R. K. Panneerselvam to get mining plan is approved vide letter No. Rc. No. 60/Mines/2021, dated 10.10.2022 for obtain Environmental clearance from the State Environment Impact Assessment Authority (SEIAA) as per the EIA Notification, 2006 and its amendments for grant of quarrying lease to ordinary stone and gravel quarry in Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District and Tamil Nadu for the period of 10 years and 5 years (From date of execution).

The mining plan for ordinary stone and gravel quarry of the applicant has been prepared as per the Assistant Director's Precise area communication letter under Rule 41& 42 of Tamil Nadu Minor Minerals Concession Rules, 1959 for quarrying ordinary stone and gravel and it has been approved by Assistant Director, Department of Geology and Mining, Karur.

As per the cluster letter issued by Assistant Director, Department of Geology and Mining, Karur vide Rc.No.60/Mines/2021, dated 31.10.2022 for Thiru. R. K. Panneerselvam (0.88.0 Ha) the lease area of above said 6 applicants comes in cluster of 500m radius. The total area of cluster is 10.74.25 Ha. The extents of lease area of all individual as per cluster letter are given below.

Proposed Quarries

1. Thiru. R. K. Panneerselvam – 0.88.0 Ha
2. Thiru. P.Prabhakaran – 0.70.93 Ha
3. Thiru. M.K.Kungumaraj – 3.00.0 Ha

Existing Quarries

1. Thiru. R. K. Panneerselvam – 1.59.32 Ha
2. Thiru. D. Sivajeeganesan – 3.41.0Ha

Abandoned Quarries

1. Thiru.K. Palanisamy – 1.15.0 H

As the projects comes under B1 (cluster) category, the applicant made TOR application individually the ordinary PARIVESH website for carrying out EIA Studies for obtaining Environmental clearance. The details are given in below table 1.1.

Table No. 1.1: Details on Terms of Reference

S. No	Name of Applicant	ToR Application No	SEAC and SEIAA Meeting No	TOR Letter No
1	R.K.Panneerselvam	SIA/TN/MIN/406955/ 2022 dated 19.11.2022	346th SEAC Meeting, dated 12.01.2023 and 591st SEIAA Meeting dated 10.02.2023	Lr.No.SEIAA-TN/F.No.9586/SEAC/ ToR-1333/2022 dated 10.02.2023

In TOR letters, it is mentioned that public hearing needs to be conducted for the proposed ordinary stone and gravel quarry of the project proponent for obtaining EC. As per MOEF&CC SO 141 (E) dated 15.01.2016-Appendix XI, there shall be one public consultation for the cluster after which the final Environmental Impact Assessment Report or Environmental Management Plan report for the cluster shall be prepared. Based on the OM issued by MOEF&CC, the Draft EIA/EMP report has been prepared for the quarry in the cluster of 10.74.25 Ha for conducting public hearing. The points raised in the public hearing and the commitments of the project proponent will be given detail in the final EIA report which will be submitted to SEAC/SEIAA, Tamil Nadu for obtaining Environmental clearance.

1.1 Scope of the Project

The proposal for Environmental clearance of ordinary stone and gravel quarry of Thiru. R.K. Panneerselvam (0.88.0 Ha) require EIA/EMP report as per Terms of Reference (ToR) for conducting public hearing and obtaining environmental clearance from SEAC/SEIAA-TN.

1.2 **Project Description**

Table No. 1. 2: Details on Project and Project Proponent

A. Proposed Projects to Conduct Public Hearing	
1. Thiru. R.K. Panneerselvam	
Particulars	**Details**
Address of the Project Proponent	**Thiru.R.K. Panneerselvam** S/o. Thiru. R.P. Kaliappan, No. 163, Rengapalayam, Punnamchatram,

	Punnam Village, Aravakuruchi Taluk, Karur District-639 136, Mobil No: 9442626411 Email id: rkpanneer@gmail.com
Lease Area	0.88.0 Hec (Patta Land)
Site Location	S.F.No: 3/2, Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District, Tamil Nadu.
Geographical Co-ordinates	Latitude: 10° 44'25.88" N to 10° 44'28.69"N Longitude: 77°57'20.81"E to 77°57'25.60"E.
Toposheet No.	58F/14
Elevation	Elevation of the area is 180m above MSL.
Precise Area Communication	Roc.No.60/Mines/2021, dated 26.08.2022
Period of Lease	10 years from the date of execution.
Mining Plan Approval Details	Mining plan approved by AD, Dept of Geology and Mining Vide Roc.No.60/Mines/2021, dated 10.10.2022
AD Cluster letter	Rc.No.60/Mines/2021, dated 31.10.2022
B. Proposed Quarries – Public Hearing Completed Files and Granted EC	
1. Thiru. M.K.Kungumaraj	
Address of the Project Proponent	**Thiru. M. K. Kungumarajh** S/o. Thiru. M. Kumaresan, No.32, M.G.R Nagar, Chinna Andan kovil street, Karur District, Tamil Nadu -639301 Mobile No: 9489682473
Lease Area	3.00.0Hec (Consent Patta Land)
Site Location	S.F. No: 182/2(P), Thirukooranam Village, Gujiliamparai Taluk, Dindigul District, Tamil Nadu
Precise Area communication	Roc.No.23/2022, dated 18.03.2022.
Period of Lease	10 Years (To be granted).
Mining Plan Approval Details	Mining plan approved by Assistant Director, Dept of Geology and Mining, Karur Vide Roc.No.23/2022, dated 24.03.2022
Public Hearing date	13.07.2023
EC Proposal No & Status	SIA/TN/MIN/67675/2019 & Granted EC

C. Existing Quarries	
1. Thiru. R. K. Panneerselvam	
Lease Area	1.59.32Ha
Site Location	S.F. No: 2/4B, 3/3(P), 3/4, Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District, Tamil Nadu.
2. Thiru. D. Sivajeeganesan	
Lease Area	3.41.0 Ha
Site Location	S.F. No: 27/2, 28, Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District, Tamil Nadu.
D. Abandoned Quarry	
1. Thiru. K. Palanisamy	
Lease Area	1.15.0 Ha
Site Location	S.F. No: 2/3, 2/4A, Anjagoundanpatti Village, Aravakuruchi Taluk, Karur District, Tamil Nadu.

1.3. Environmental Settings and Mining Details

Table No. 1.3: Environmental Settings

<table>
<tr><th colspan="2">Accessibility</th></tr>
<tr><td>Nearest Village</td><td>Anjagoundanpatti Village
For Lease Area of R.K. Panneerselvam – 1.8km – SE</td></tr>
<tr><td>Nearest Settlement</td><td>
<table>
<tr><th>S. No</th><th>Village Name</th><th>Total population as per 2011 census</th><th>Distance with Direction</th></tr>
<tr><td>1</td><td>Anjagoundanpatti</td><td>220</td><td>1.8-SE</td></tr>
<tr><td>2</td><td>E Alamarathupatti</td><td>3113</td><td>1.5 km-NE</td></tr>
<tr><td>3</td><td>Thirukooranam</td><td>6487</td><td>1.6 km -N</td></tr>
<tr><td>4</td><td>Seethapatti</td><td>364</td><td>1.5 km- NW</td></tr>
<tr><td>5</td><td>Senthampatti</td><td>1628</td><td>3.9 km - E</td></tr>
</table>
</td></tr>
<tr><td>Nearest Town</td><td>Aravakurichi – 6.0 km -NW</td></tr>
<tr><td>Nearest Railway station</td><td>Palayam – 20 km -E</td></tr>
<tr><td>Nearest Airport</td><td>Tiruchirappalli International Airport – 82 km – E</td></tr>
</table>

Environmental Sensitiveness	
Interstate Boundary	Tamil Nadu –Kerala Interstate boundary – 93 km (W)
Coastal Zone	Bay of Bengal – 155km –E
Reserve Forest	1. Rengamalai Reserve Forest– 10 km 2. Vadamalai Reserve Forest – 1.5 km The proposed projects site does not attract Forest Conservation Act, 1980.
Wildlife sanctuary	Nil within 10km radius. The Proposed projects site does not the Wildlife (Protection) Act, 1972.
Water bodies	1. Godavanar River – 700m – E 2. Godavanar Check dam – 750m – NE 3. Alamarathupatti lake – 1.6km – NE 4. Small odai – 1.3km – NE 5. Amaravathi river – 8.4km – NW 6. Nanganji River – 5.2km – W 7. A lake near ponnambatti – 5.00km -N
Defense Installations	Nil within 10km radius
Critically Polluted area	Nil within 10km radius
Seismic zone	Zone-III, Moderate damage risk zone as per BMTPC, Vulnerability atlas Seismic zone of India IS: 1893-2002

Table No. 1.4: Mining Details

R.K. Panneerselvam Ordinary Stone and Gravel Quarry	
Method of Mining	Open cast -Mechanized method of mining
Geological resources (95%)	89291 m^3
Mineable reserves (95%)	54378m^3 @ 95% up to depth 33m and 12672m^3 of gravel up to a depth of 3m after leaving necessary safety distance from the lease boundary.
Production (95%)	Ordinary Stone – 35283m^3 for five years or 7057 m^3 PA
Top soil	Gravel – 12672m^3
Ore: Waste ratio	1: 0.52
Depth of Mining	33m bgl
Water Table	36 m bgl
Road design	1: 10 inside the pit and ramp / 1:16 for transport
Overall Pit Slope	45°
Period of Lease	10 years (From the date of execution)
Project Cost	Rs 11.0 Lakhs
EMP Cost	Rs 4.00 lakhs
CER Cost	Rs.5 lakhs

1.4. **Description of the Environment**

1.4.1 Base Line Environmental Study

Collection of base line data is an integral part of the preparation of environmental impact assessment reports. The baseline monitoring study has been carried out during 1st March 2022 – 31st May 2022 to assess the existing environmental scenario in the area. For the purpose of EIA studies, mine lease area was considered as the cluster core zone and area outside the mine lease boundary up to 10km radius from the lease boundary was considered as buffer zone.

Table No. 1.5: Baseline Data

Particulars	Details	Standards
Meteorology (1st March 2022 – 31st May 2022)		
Rainfall (Avg.)	45.2 mm	--
Temperature (Avg.)	22-38°C	--
Wind speed	2.2 m/s	--
Wind Direction	Predominantly from West to East	
Ambient Air Quality (NAAQS)		
PM_{10}	39-52 µg/m^3	100 µg/m^3
$PM_{2.5}$	18-33 µg/m^3	60 µg/m^3
SO_2	4-14 µg/m^3	80 µg/m^3
NO_x	6-18 µg /m^3	80 µg/m^3
Noise Level (CPCB Standards)		
Day time (6:00 am - 10:00 pm)	Cluster Core zone – 46.0 dB (A) Buffer zone – 40.4- 45.6 dB (A))	**Industrial Area** Day Time - 75 dB (A) **Residential Area** Day Time – 55 dB (A)
Night time (10:00 pm - 06:00 am)	Cluster core zone – 36.4 dB (A) Buffer zone – 31.0-35.3 dB(A	**Industrial Area** Night Time – 70 dB(A) **Residential Area** Night Time – 45 dB (A)
Water Quality IS 10500:2012 (Desirable limits)		
pH	7.24-8.4	6.5 to 8.5
TDS	493-3722 mg/l	500 mg/l
Electrical conductivity at 25˚C	882-5794 micromhos/cm	
Total Hardness as $CaCO_3$	95-1676 mg/l	200 mg/l
Total suspended solids	2-20	IS 3025:P.17: 1984:R.2017
Chlorides Cl	668-2003mg/l	250

Total iron Fe	0.01-2mg/l	0.3mg/l
Sulfates SO_4	13-107mg/l	200 mg/l
Soil Quality		
pH	6.65-8.92	Neutral to slightly alkaline
Bulk density	1.00-1.27 g/cc	Favorable physical condition for plant growth.
Hydro Geology		
Water Table	32 to 48 m bgl	

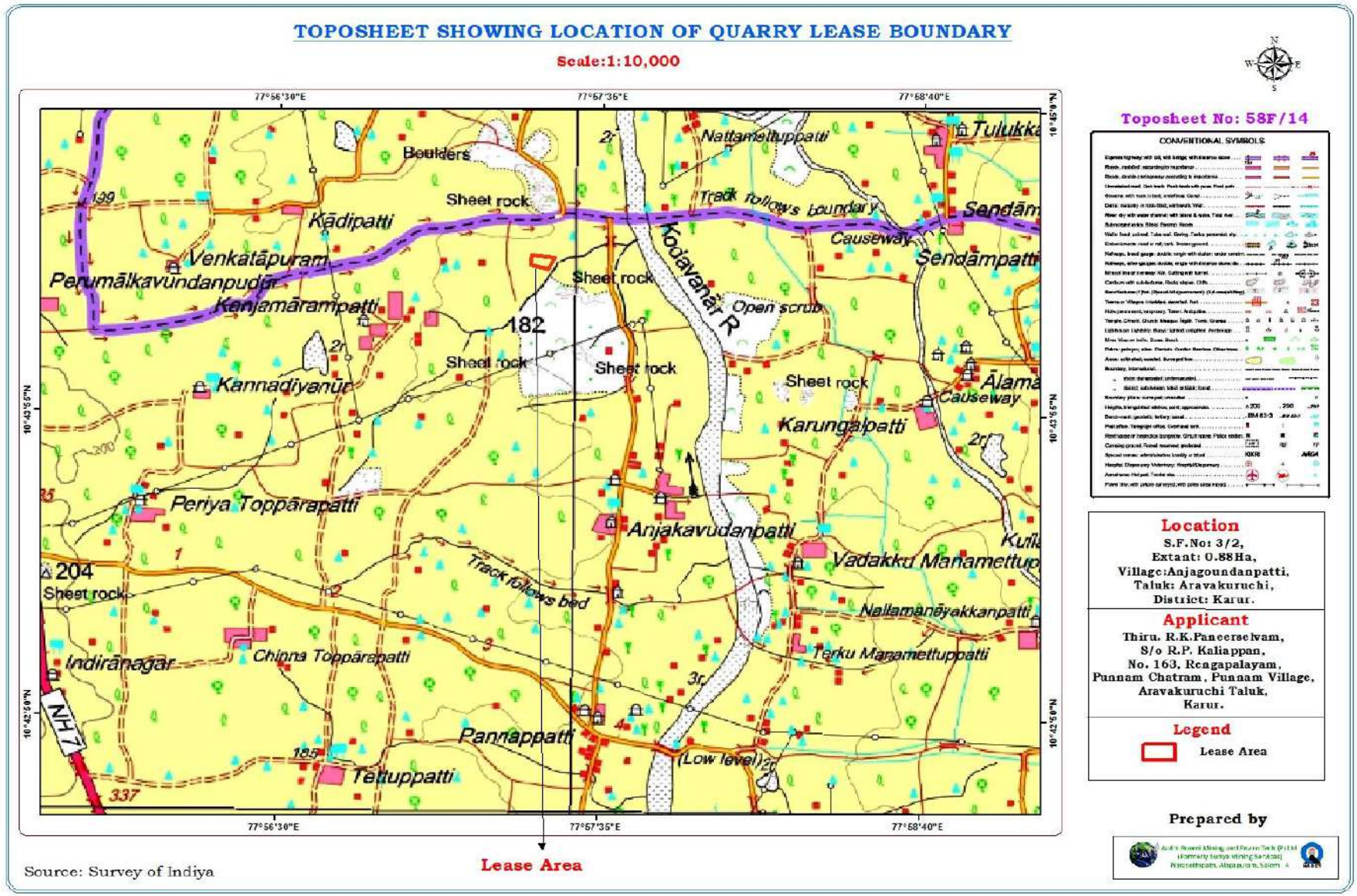

Fig No. 1.1: Toposheet showing location of the lease area

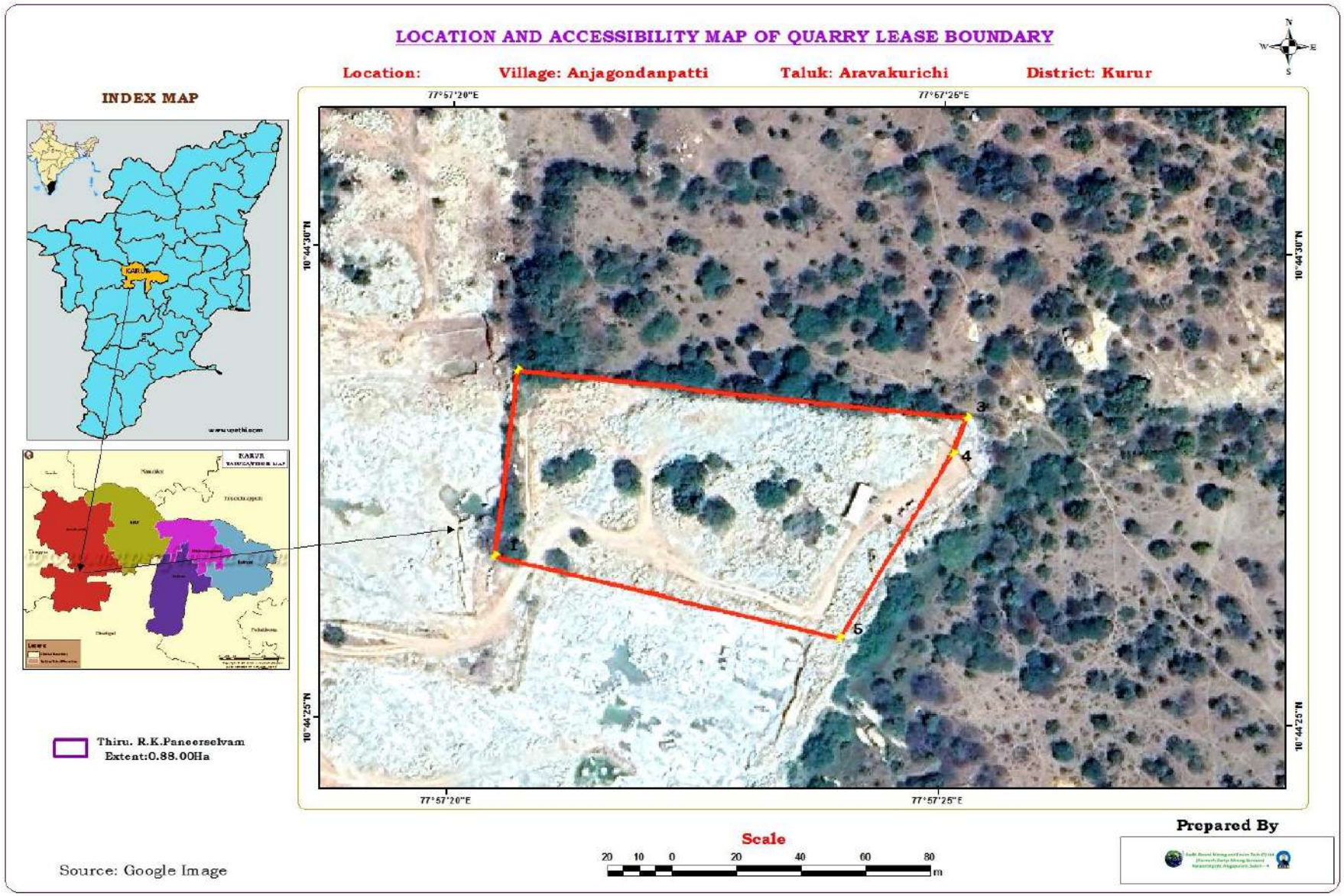

Fig No. 1.2: Map Showing the Location and Accessibility of Quarry Lease Boundary

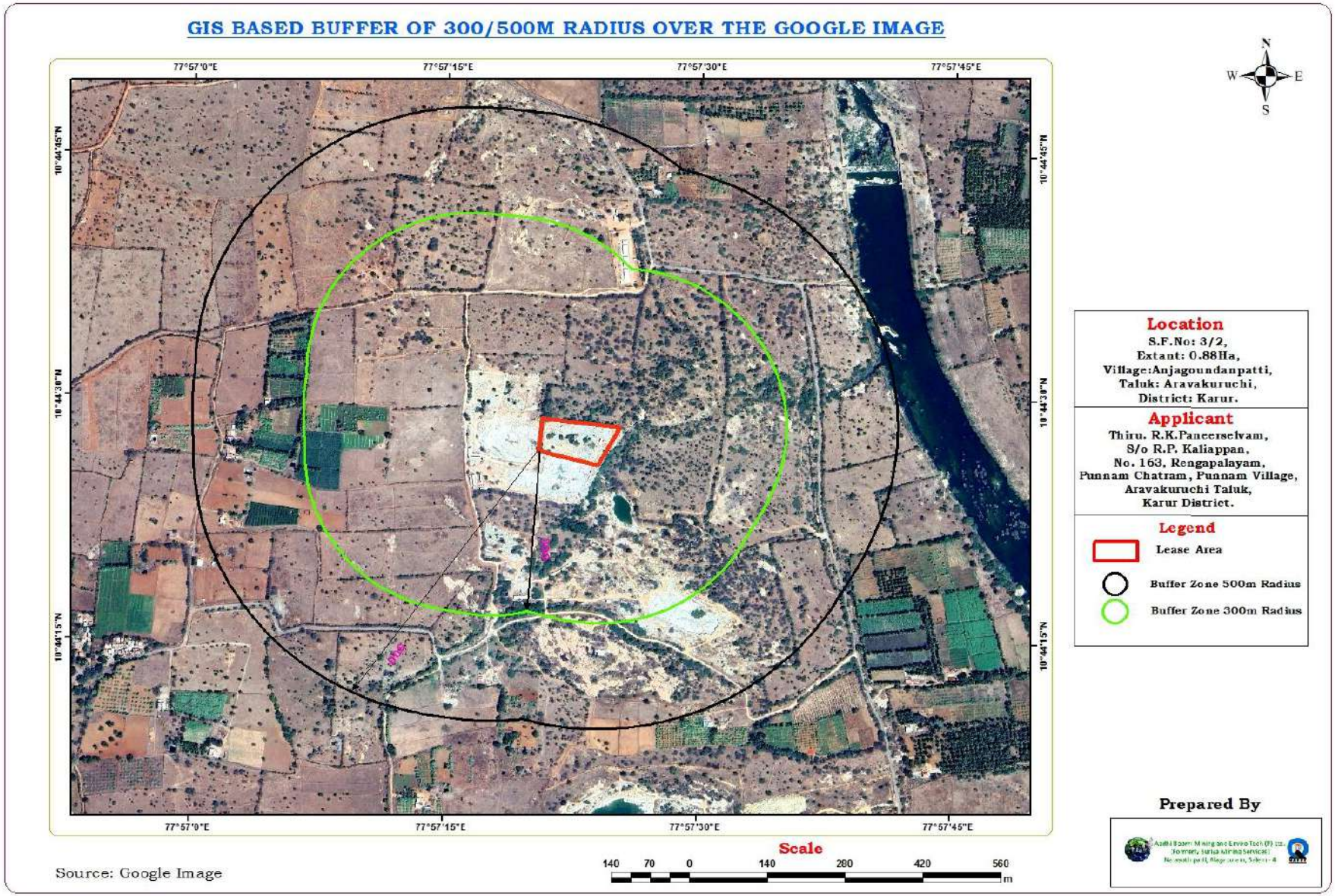

Fig No. 1.3: Google Earth Image showing 300m and 500m radius around cluster lease area

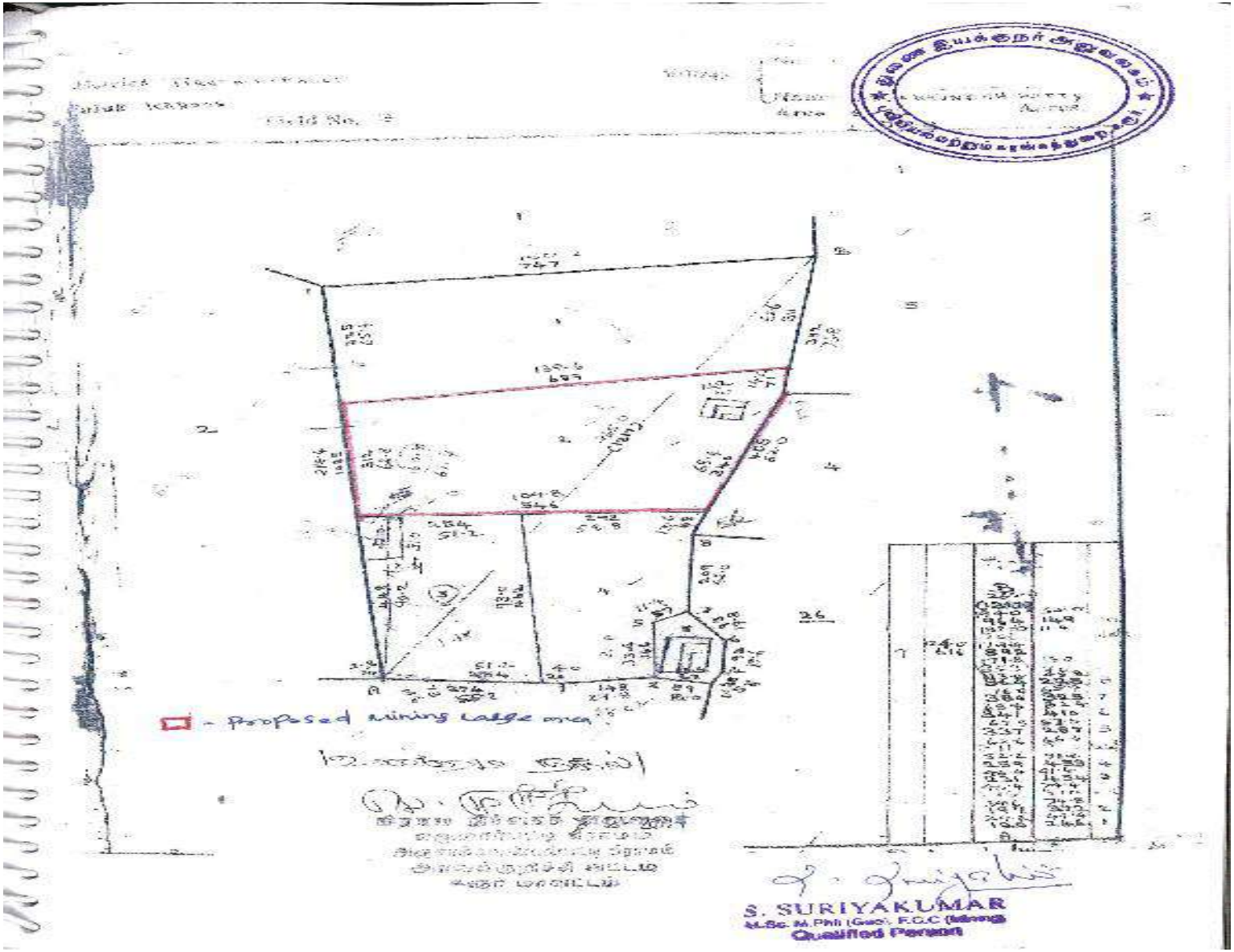

Fig No 1.4: FMB of the lease area

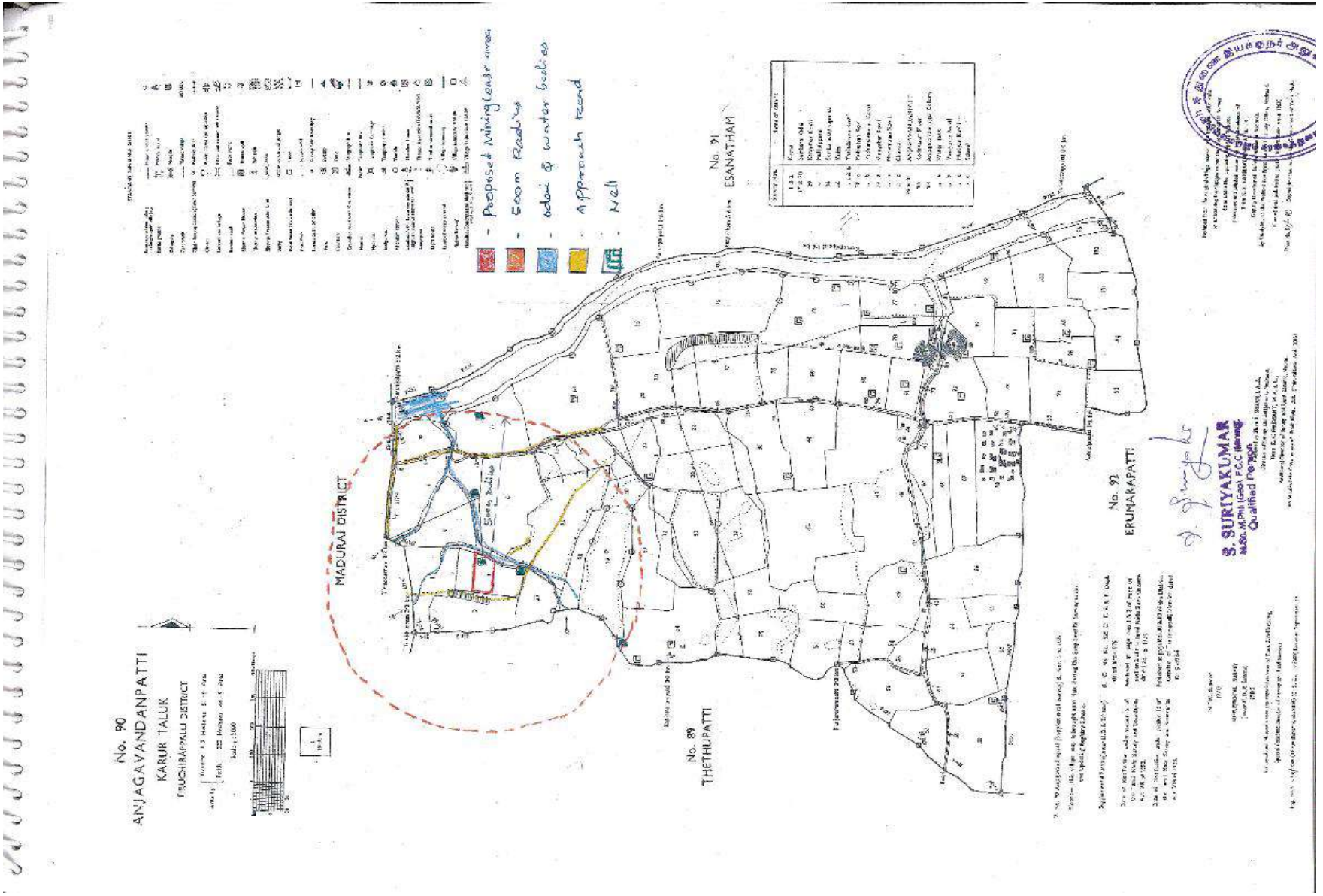

Fig No 1.5: Village Map

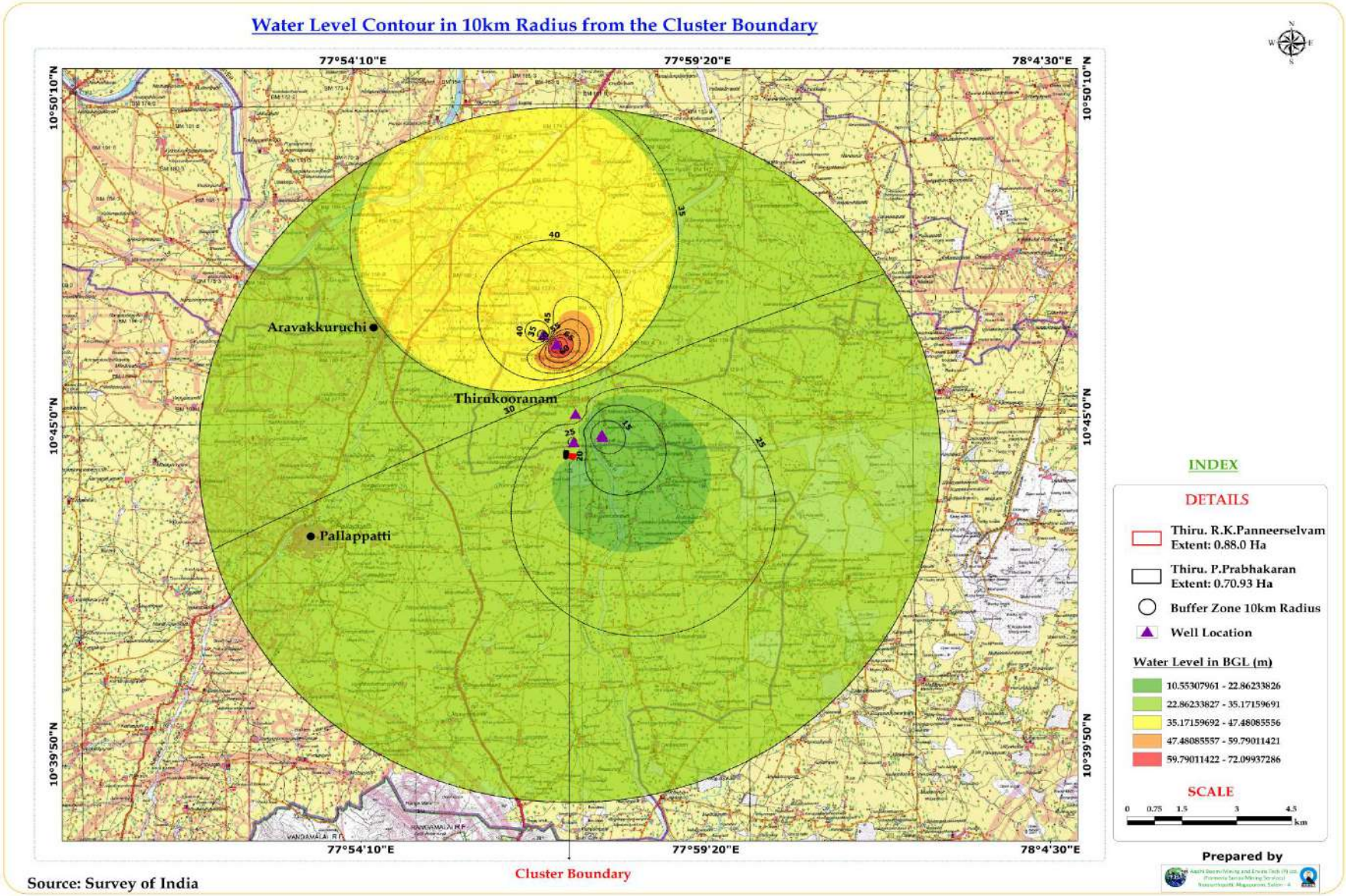

Fig No.1.6: Water level contour in 10km radius from the cluster boundary

Fig No 1.7: Conceptual plan of the Thiru.R.K.Panneerselvam

1.5 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

1.5.1 Air Environment

The air borne particulate matter is the main air pollutant by opencast mining. The mining operation will be carried out by adopting mechanized methods which involves Jack Hammer drilling and blasting, excavation, loading and transportation.

AERMOD - Model was used for prediction of impact of PM_{10} during conditions i) Loading/unloading and transportation of ore by trucks on Haul roads ii) Blasting by using area source model to predict GLC of PM_{10} during these conditions. Total predicted 24-h maximum GLC of PM_{10} at project site for scenario 1 i.e loading-unloading and transportation and scenario 2 i.e blasting was 68.07µg/m^3 and 54.18 µg/m^3 respectively occurred at the project site after superposition of base-line value 48 µg/m^3 over the incremental 20.07 µg/m^3 and 6.18 µg/m^3 respectively due to combined impact of loading and unloading and transportation over the haul road and due to blasting.

The predicted incremental GLC of SO_x and NO_x for scenario 3 i.e. due to the operation of excavator and movement of vehicle in the project site were found to be 1.95/m^3 µg/m^3 and 3.31µg/m^3. Therefore the total predicted GLC of SO_x and NO_x will be 10.95µg/m^3 and 17.31µg/m^3 respectively

Maximum Impact of PM_{10}, SO_x and NO_x was observed close to the source within the lease area due to moderate wind speeds

When all the quarries in the cluster area are working together the incremental GLC will be high and it may cross the prescribed limits by NAAQS. To overcome such situation, cluster committee should be formed and adopt the environmental management plan effectively as per EIA report.

1.5.2 Noise Environment

Noise pollution poses a major health risk to the mine workers. The sources of noise in the proposed open cast ordinary stone and gravel quarry are such as Drilling, Blasting, and during movement of vehicles.

The noise generated by the mining activity is dissipated within the cluster core zone. This is because of distance involved and other topographical features adding to the noise attenuation. From the results, it can be seen that the ambient noise levels (day time and night time) at all the locations will remain within permissible limits prescribed by CPCB and 90dB (A) norms of DGMS. At present there is no mining activity carried out. However, the expected noise levels are

not likely to have any effect. Precaution will be made to keep down the noise exposure level of 85 dB (A) to the operating personnel for 8 hrs duration. The charge per blast of 38kg is above the Peak Particle Velocity below 5mm/s. So the proponent will be advised to use five delays to keep the ground vibration within 5mm/s. However, as per statutory requirement additional control measures needs to be adopted to avoid the impacts due to ground vibrations and fly rocks due to blasting.

1.5.3 Ground Vibration

The charge per blast of 6kg is well below the Peak Particle Velocity of 5mm/s for the habitation located at the distance of 140m.

1.5.4 Water Environment

Mining operations can affect groundwater quality in several ways. The most obvious occurs in the mining below the water table, either in underground workings or open pits. This provides a direct conduit to aquifers. Groundwater quality is also affected when waters (natural or process waters or wastewater) infiltrate through surface materials (including overlying waste or other material) into ground water. But this ordinary stone mine is devoid of any such impacts.

The impact due to mining on the water quality is expected to be insignificant because of no use of chemicals or hazardous substances during mining process. The mining activity will not intersect ground water table and it is 36m below ground level. The water sample from all the locations including cluster core zone except Thethupatti has high TDS and TH exceeds the permissible limit. Chlorides were found to be high in all the five locations.

The WQI of the samples collected from the study area are given in tables 4.25 and 4.26. It can be seen that the study area has water quality index value ranging from 60.2 to 322.4 which reflects the Poor water quality to unfit for drinking status of the groundwater quality. The findings demonstrate the varying consistency of groundwater at different locations. All the groundwater samples under poor to unfit for drinking category; it may be due to the absorption of fertilisers, geological condition, channel water, solid waste, sewer drainage, septic tanks, and agricultural waste. The water should be treated by reverse osmosis to reduce dissolved solids and total hardness to the required rate.

1.5.5 Soil Environment

For the mining plan period of five years, the generation of top soil is estimated at 12672 m^3. It will be dumped along mining lease boundary as earth bund and it will be utilized for green

belt development within the lease area. No chemical or toxic elements will be used during mining activity. So the health of soil in and around the quarry will not be affected.

1.5.6 Waste Dump

The proposed rate of production of ordinary stone for five years is about 54378m^3 at the rate of 95% recovery up to permissible depth. The 5% reject of 2862 m^3. The rejects materials are dumped along lease and backfilled at the end of mine life.

1.5.7 Biological Environment

There are no notified endangered species in the area, which may be affected due to the quarry activities; therefore the biological environment will not have significant impact due to quarrying activity. The impact on the biological environment due to amount of dust generation is minimized by well-developed green belt in and around the quarry lease area.

1.5.8 Land Environment

Ordinary stone and gravel quarry project will result in disturbance of the land use pattern of the mine lease area. The impact on the topography in the form of changed landscape is unavoidable during mining activities like excavation, overburden dumping, soil extraction etc. Land requirement for the project has been assessed considering functional needs. So reclamation of mined out land will be given due importance as a step for sound land resource management. There is no release of toxic elements into the ground. No adverse impact is anticipated on land use of buffer zone associated due to the mining activity, as all the activities will be confined within the project site. The mining operations will impact the land usage and land aesthetics of quarry lease area. The land use analyses show that the tree plantation was done around the mining lease area of R.K. Panneerselvam. The rate of plantation increases over a period of time due to quarry activity. At the end of the project, the quarried pit will be act as water storage pond. The stored water will be used for developing coconut, mango and groundnut plantation around the mining lease area. It will improve the livelihood of village people. The evaporation rate of the water in the pit is given detail in the report.

1.5.9 Socio Economic Environment

The quarrying activity will definitely increase the employment opportunity (directly as well as indirectly) in the project area. Some of these impacts would be beneficial. The expectation of the people of area is concerned towards employment, education, road and health facilities. The literacy rate may be increased with the economic benefits which may arise from the quarrying activities. Direct employment 30 persons and Indirect employment - 20 persons.

Table No. 1.6: Environmental Management Plan			
S. No	**Parameters**	**Mining Activity**	**Mitigation measures**
1	Air Environment	Drilling	▪ Dust extractor or wet drilling to be followed to control dust at source of emission ▪ Use of Sharp drill bits for drilling holes and charging the holes by using optimum charge and using time delay detonator
		Blasting	▪ Regular water sprinkling on blasted heaps at regular intervals will help in reducing considerable dust pollution
		Loading	▪ Water sprinkling be done before loading by making it moist
		Transportation	▪ Water sprinklers along the sides of haul road shall be fixed to control fly of dust while transporting minerals and waste ▪ Overloading will be prevented ▪ Trucks/Dumpers covered by tarpaulin covers
		DG Sets	▪ DG sets will be used only during power failure ▪ Adequate stack height for DG sets will be provided as per CPCB norms
		General measures	▪ Avenue trees along roads around ML boundary shall be planted as per the norms of MoEF to control fly of dust. ▪ Labours engaged in such dust prone areas should be provided with safety devices like ear muff, mask, and goggles as per the MMR, 1961 amendments and circulars of DGMS. ▪ Regular health check–up of workers and nearby villagers in the impacted area should be carried out and also regular occupational health assessment of employees should be carried out as per the Factories Act ▪ Ambient Air Quality Monitoring will be conducted on regular basis to assess the quality of ambient air.
2	Water Environment	Surface water	▪ Wastewater discharge from mine will be treated in settling tanks before using for dust suppression and tree plantation purposes.
		Ground water	▪ The mining activity will not intersect the ground water table ▪ Desalting will be carried out before and immediately after the monsoon season

		Storm water	➢ Pit will be used for Storage of rainwater ➢ Rain water will be collected in sump in the mining pit and will be allowed to store and pumped out to surface setting tank of 15 m x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression onwards and such sites where dust likely to be generated and for developing green belt. ➢ The proponent will collect and judicially utilize the rainwater as part of rain water harvesting
		General measures	➢ Regular monitoring and analyzing the quality of water
3	Noise Environment	Drilling	➢ Limiting time exposure of workers to excessive noise
		Blasting	➢ Carrying out blasting only during day time and not on cloudy days ➢ Noise levels will be controlled by using optimum explosive charge, proper delay detonators and proper stemming to prevent blow out of holes. ➢ Providing proper noise proof enclosure for the workers separated from the noise source and noise prone equipment
		Transportation	➢ Proper and regular maintenance of vehicles, machinery and other equipments. ➢ The noise generated by the machinery will be reduced by proper lubrication of the machinery and other equipments. ➢ Speed of trucks entering or leaving the mine will be limited to moderate speed to prevent undue noise from empty vehicles. ➢ Adequate silencers will be provided in all the diesel engines of vehicles. ➢ Minimum use of horns and speed limit of 10 km/hr in the village area. ➢ It will be ensured that all transportation vehicles carry a valid PUC Certificates
		General measures	➢ Use of personal protective devices i.e., earmuffs and earplugs by workers, who are working in high noise generating areas ➢ Provision of Quiet areas, where employees can get relief from workplace noise. ➢ The development of green belts around the periphery of the mine to attenuate noise. ➢ Regular medical check–up and proper training to personnel to create awareness about adverse noise level effects.

4	Vibration	Blasting	➢ Specific charge pattern has to be designed by proper trial vibration studies with varying charge ratios. ➢ Milli second detonators shall be used preferably 25–50ms per delay to control vibrations ➢ If the vibration still exceeds the limit a long Trench to a depth of 6m may cut in the direction of wave's movement to break longitudinal waves which travel close to surface, preferably near mine buffer zone ➢ In spite of all measures periodical testing of vibration and noise using approved seismograph by DGMS has to be followed as a part of Environmental monitoring
5	Soil Environment	Topsoil	➢ Humus top soil shall be preserved for reuse in afforestation and agriculture ➢ Top soil should not be mixed with other waste or reject materials. It should be conserved by judicious utilization in the mine premises ➢ Garland drains will be provided around the mine and dumps to arrest any soil from the mine area being carried away by the rain water. This will also avoid the soil erosion and siltation in the mining pits and maintaining the stability of the benches
6	Waste Dump	Stabilization of Dumps	➢ The rejects\ waste dump shall be properly terraced in to 1.5m benches with proper repose angle and then the top soil shall be spread over the dumps and slope to make them humus for some time, after the soil suitable for water retention trees will be planted at the top, slope and toe of the stabilized dumps to form vegetation ➢ Garland drainage around dump shall prevent under wash of dump by hydrostatic pressure to be developed by surface water and control wash outs and collapse
7	Plantation	Mine lease boundary and waste dump	➢ Provision of green belt all along the periphery of the lease area for control of dust and to attenuate noise ➢ Stabilization of Dump with plantation ➢ It is strongly recommended that the loss of plant in each year will be counted and again planted in subsequent plantation. ➢ The plant should be planted taken from nursery, where the survival rate is high.

8	Land Environment		➢ The restoration of the degraded land would cover backfilling and terracing with the overburden / wastes and surfacing the same with top soil. ➢ Provision of Garland drainage around the dumps ➢ Fast growing trees and other native shrubs would be planted to stabilize the reclaimed land ➢ Appropriate measures will be taken for Green belt development. ➢ The rain water will be stored in the pit which will recharge the ground water as a part of rain water harvesting scheme for irrigating the nearby agricultural lands.
9	Socio Economic		➢ Good maintenance practices will be adopted for machinery and equipment, which will help to avert potential noise problems. ➢ Green belt will be developed in and around the project site as per Central Pollution Control Board (CPCB) guidelines. ➢ Drilling, blasting etc at specified location will be followed with proper schedule. ➢ Appropriate air pollution control measure will be taken so as to minimize the environmental impact within the core zone. ➢ An emergency preparedness plan will be prepared in advance, to deal with firefighting, evacuation and local communication. ➢ For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices has been provided which meet 'BIS' (Bureau of Indian Standards). ➢ As a part of CSR activities community welfare measures will be taken by Proponent through local Panchayat.
10	Occupational Health		➢ First-aid facilities as per provisions under Rule (44) of Mines Rules 1955 ➢ Initial and Periodical medical examination shall be conducted for the employees under Rule 29B & 45 (A). ➢ Insurance will be taken in the name of the labourers working in the mines ➢ Workers involved in mining work shall be provided protective equipments such as Thick Gloves, Goggles, ear plugs, safety boot wears, etc…

1.6 Analysis of Alternatives

The quarrying site is dependent on the geology and mineral deposition of the area. Hence, this project is, mineral and site specific and no alternative site considered for this project.

1.7 Environmental Monitoring Program

Success of any environmental management programme depends upon the efficiency of the organizational set up responsible for the implementation of the programme. Regular monitoring of the various environmental parameters is also necessary to evaluate the effectiveness of the management programme. Environmental Monitoring Programme will be conducted for various environmental components as per conditions stipulated in the Environmental Clearance Letter issued by SEIAA & Consent to Operate issued by TNPCB.

Table No. 1.7: Post Project Environmental Monitoring Program

S. No.	Environment Attributes	Location	Monitoring		Remarks
			Duration	Frequency	
1	Meteorology and Air Quality	Continuous monitoring weather station in core zone/ nearest IMD station	24 hours	Monthly Once	Wind speed, direction, Temperature, Relative humidity and Rainfall.
2	Air Pollution Monitoring – $PM_{2.5}$, PM_{10}, SO_x and NO_x	5 locations (One station in the core zone and at least one in nearby residential, area, one in the upwind, two station on the downwind direction and one in cross wind direction)	8 hours	Once in six months	Fine Dust Sampler and Respirable Dust Sampler
3	Water Pollution Monitoring	Mine effluents, Set of grab samples during pre and post monsoon for ground and surface water in the vicinity.	–	Once in six months	Phyiso–chemical, microbiological characteristics
4	Hydrogeology	Water level in open wells in buffer zone around 1km at specific wells	-	Once in six months	Water level monitoring devices may be used.
5	Noise	Mine Boundary, high noise generating areas within the lease and at the nearest residential area	24 hours	Monthly Once	Sound level meter

6	Vibration	At the nearest habitation (in case of reporting)	–	During blasting operation	Digital Seismograph
7	Soil	Core Zone and Buffer zone (Grab samples)	–	Once in six months	Physical and Chemical characteristics

1.8 Project Benefits

The proponent, Thiru. R.K. Panneerselvam is very much conscious of his obligations to society at large. Under plantation programme, it is suggested to develop green belt further all along the boundary of the quarry lease area. Apart from the green belts and aesthetic plantation for eliminating fugitive emissions and noise control, all other massive plantation efforts will be executed with the assistance of experts and cooperation of the local community. The quarrying activity will create rural employment. In addition there will be indirect employment to many more people in the form of contractual jobs like construction of infrastructural facilities, transportation of ordinary stone and gravel to destinations, sanitation, supply of goods and services to the quarry and other community services etc. The local population will have preference to get an employment. The proponent will help in socio economic development of the village by providing educational facilities to children, and welfare amenities like drinking water to school; road and medical facilities to villages and employment opportunities to nearby villagers. CSR budget is allocated as 2.5% of the profit.

1.9 Conclusion

As discussed, it is safe to mention that the project is not likely to cause significant impacts on the ecology and environment of the area, as adequate preventive measures will be adopted to contain the pollutants within permissible limits. The total operations shall be carried out with ease & minimum risk to the workers. The proposed Environmental Management Plan will keep the area in a safe environment with negligible impact on the environment. Plantation will substantiate the impact due to the quarrying activity. Quarrying activity will help in improving the socio–economic benefits in areas like employment, communication and infrastructure development.